

LUMBER

try. Forests echoed with the long-drawn warning cry of "Timber...err" as great trees came crashing to earth. *Lumberjacks*, who cut down trees and delivered logs to the mills, became famous as strong, hearty, courageous workers. Many legends sprang up about their exploits as they cleared forests and took logs to the mill by ox team, by raft, or by guiding them down rushing streams after spring thaws. Some of the stories about early loggers are true. Others, such as the tales of the legendary giant Paul Bunyan, are humorous exaggerations (see BUNYAN, PAUL).

The Life of a Logger. Lumberjacks must have strength, courage, and be highly skilled in their work. Large-scale lumbering operations require special mechanical equipment and technical knowledge.

The life that loggers lead today differs greatly from their life before the 1900's. Years ago, loggers lived in large bunkhouses in logging camps where there were few comforts. They spent most of their time either working or sleeping. Today, most loggers live in their own homes. They drive to work in the morning just as people with other jobs do. Some loggers ride to where the trees are being cut in company trucks or buses. They live in a logging camp only if the logging site lies in a hard-to-reach place, such as in a rugged mountain area. Only a few logging camps still exist in the United States today. But modernized camps are still being used in the forests of Canada. The modern camp, unlike the camp of long ago, has comfortable facilities for eating, sleeping, and recreation. Some camps have private houses for families.

Cutting Down Trees. Before the loggers go into the woods, a *forester* decides which trees they should cut.

LUMBER TERMS

Board Foot is a piece of lumber 1 foot (30 centimeters) long, 1 foot wide, and 1 inch (2.5 centimeters) thick. It equals 0.083 cubic foot (0.0024 cubic meter).

Flooring is lumber used in floors. It is usually hardwood, 1 inch (2.5 centimeters) thick and 2 to 4 inches (5 to 10 centimeters) wide.

Landing is a central place in the forest where logs are brought before being taken to a sawmill.

Log Rule is a table that shows about how much lumber can be sawed from logs of different sizes.

Lumberjack, or Logger, is a worker who cuts down trees, saws them into logs, and brings them to the mill.

Millwork is material made of finished wood in mill-work plants or planing mills. It includes doors, blinds, frames, cornices, columns, mantels, and panelwork.

Paneling is lumber made into panels, especially for the insides of buildings.

Plank is a piece of lumber 2 to 4 inches (5 to 10 centimeters) thick and 4 or more inches wide.

Plywood is a panel made of thin layers of wood glued together under heavy pressure.

Sawmill is a plant that saws logs into lumber.

Sawtimber means trees large enough to be cut for lumber.

Siding is lumber used to cover the outsides of buildings.

Skid Road is a road or trail leading from a cutting area to the skidway or landing.

Skidding means hauling or dragging logs from the cutting area to the landing.

Slabs are the outside pieces of a log removed in sawing lumber.

Stumpage is timber that stands uncut in a forest.

The forester is a scientist trained in growing crops of trees so that they will yield the greatest possible amount of lumber. He or she also knows how to protect forests from fire, insects, disease, and grazing animals.

Loggers called *fallers* come to work carrying their own power saws. They *fell*, or cut down, trees that the forester has marked for cutting. The power saw that the fallers use may weigh as much as 40 pounds (18 kilograms). With its small gasoline motor and whirling chain saw, it can slice through a tree trunk in a few seconds.

In felling a tree, the faller first makes an *undercut*. A wedge-shaped piece is cut out of the tree trunk with an ax or power saw. The faller makes the undercut on the side of the tree that is to fall toward the ground. The cut is made close to the ground to avoid wasting valuable wood by leaving a high stump. After the saw has cut through the tree trunk, the undercut makes the tree lose its balance and fall toward that side. Expert fallers can drop a tree exactly where they want it. They can avoid striking other trees, or hitting stumps that might break or damage the trunk of the falling tree.

Some tree trunks may measure 200 feet (61 meters) or more in length. Workers called *buckers* cut the trunks into shorter lengths, so that they can take them out of the forest more easily. Buckers use axes or power saws to lop off the limbs. Then they saw the trunks into logs from 8 to 40 feet (2.4 to 12 meters) long.

Since the mid-1900's, large modern machines have simplified the work of loggers. For example, hydraulic *tree shears* quickly cut through a tree like giant scissors. They are built into tractors that move from tree to tree (see FORESTRY [picture: Harvesting and Planting Trees Mechanically]). Other machines do more than one job. Some *tree harvesters* fell a tree, remove its branches, cut it into logs, and sort the logs in bunches.

Transporting Logs from the woods to the sawmill is the second step in logging. It consists of two operations. First, the loggers *skid* (drag or haul) the logs to the *landing* (a central place in the woods). Then they transport the logs from the landing to the sawmill.

Workers use horses, tractors, or long cables called *draglines* to skid the logs to the landing. Usually, the logs are hauled over the ground. But sometimes workers transport them in special carriers. In the Northern Forest, for example, loggers use big sleds to carry logs over icy roads in winter.

A system called *high-lead* (pronounced *led*) logging uses pulleys and steel cables to drag logs up steep slopes or to swing them across ravines. The pulleys and cables are supported by portable towers and are powered by giant diesel, steam, or electric winches. The cables pick up only one end of the log. The other end may drag along the ground. High-lead logging can bring logs to a landing as far away as 800 to 1,500 feet (240 to 457 meters). Other cable-logging systems can carry logs 2,500 feet (762 meters) or more. Such systems use cables called *skylines*. Skylines pick up the entire log instead of dragging one end over the ground. Logging with skylines does less damage to the forest floor than high-lead logging.

After skidding, the logs are piled at the landing until they can be moved to the mill. If the landing lies near a road, trucks carry the logs to the mill. If it is on a railroad line, flatcars transport the logs. If the landing

is on the bank of a stream or river, workers use chains to bind the logs into rafts that float to the mill. Sometimes barges carry logs. Trucks transport the largest number of logs to sawmills.

From Sawmill to Lumberyard

The United States has about 30,000 sawmills. Most lumber comes from small sawmills, each of which produces less than 10 million board feet (24,000 cubic meters) of lumber a year. Some mills are so small that the *headrig*, or sawing machinery, can be loaded on a truck trailer and hauled into the woods.

Many large softwood mills stand beside a pool of water. This pool is the *log pond*, in which the logs are kept until they go into the mill. The water protects them from insects, fungi, stain, and fire. Large trucks carrying logs to the mill dump their loads into the log pond. *Boom men* wearing spiked boots walk about on the wet logs in the pond. They use long poles to sort the logs. They make sure that all the logs of one kind or size go into the mill together. A growing number of softwood mills store their logs on dry land and handle them with modern loading devices. Hardwood mills also store their logs on dry land because heavy hardwood logs may sink in water.

Sawing Logs. A moving conveyer chain carries the logs up a wooden chute into the mill. Jets of water forced through overhead pipes give the logs a stinging bath. By the time the logs enter the mill, no sand, dirt, or small bits of metal remain on them that might dull the sharp saw blade.

In many mills, a *log debarker* removes the bark before the log reaches the first saw, called a *headsaw*. One kind of debarker consists of metal bars or knives that rub off or chip off the bark. Another type tears off the bark by the force of water shot onto the log under great pressure.

As a log enters the sawmill, machinery moves it onto a platform called a *carriage*. The carriage looks somewhat like a small railroad flatcar. It carries the logs into the teeth of the headsaw. The saw makes a screaming sound as it tears into the wood. Each time the carriage goes past the saw, the saw slices off a board until the log has become a pile of boards.

Moving belts then carry the newly made boards, called *green lumber*, to the *edger*, a set of smaller saws. These saws trim the rough edges from each board and make the sides straight and even. Next, the edged boards go to the *trimmer*. This set of saws makes the ends of the boards square, and cuts the boards to the exact lengths ordered by lumber dealers. The trimmer also cuts off weak or bad spots.




































Gang saws are used in most lumber mills in Europe and in some mills in the United States. In these mills, after the outer slabs of the logs are removed, the edged log moves into a set of several straight-bladed saws. These saws are spaced to cut the "squared-up" log into boards of the desired thickness in one operation.

Grading Lumber. The green boards, now called *rough lumber*, ride slowly on the *green chain*, a moving belt. Workers called *graders* walk along the green chain, examining each board carefully and deciding its grade. They sort the boards according to size, quality, and kind of wood. Each grader carries two long sticks. One stick has a hook, which the grader uses to flip boards over. The other stick has a crayon on the end, with which the grader marks the grade on each board.

There are eight grades used by the National Hardwood Lumber Association to classify hardwood. The grades are, from highest to lowest: (1) *firsts*, (2) *seconds*, (3) *selects*, (4) *No. 1 common*, (5) *No. 2 common*, (6) *sound*

Leading Lumber-Producing States and Provinces

Lumber produced in 1977

































British Columbia	         
	10,626,000,000 bd. ft. (25,074,200 m ³)*
Oregon	      
	7,532,000,000 bd. ft. (17,773,300 m ³)
California	   
	5,109,000,000 bd. ft. (12,055,700 m ³)
Washington	   
	4,158,000,000 bd. ft. (9,811,600 m ³)
Quebec	 
	2,429,000,000 bd. ft. (5,731,700 m ³)*
Idaho	 
	2,031,000,000 bd. ft. (4,792,600 m ³)
Arkansas	 
	1,519,000,000 bd. ft. (3,584,400 m ³)
Montana	 
	1,340,000,000 bd. ft. (3,162,000 m ³)
Alabama	
	1,312,000,000 bd. ft. (3,095,900 m ³)
Georgia	
	1,284,000,000 bd. ft. (3,029,900 m ³)

*Figures are for 1976.

Sources: U.S. Bureau of the Census; Statistics Canada.

Leading Lumber-Producing Countries

Lumber produced in 1977

Russia	         
	47,060,000,000 bd. ft. (111,000,000 m ³)
United States	        
	37,757,000,000 bd. ft. (89,095,200 m ³)
Japan	  
	16,221,400,000 bd. ft. (38,258,000 m ³)
Canada	  
	15,604,000,000 bd. ft. (36,820,800 m ³)*
China	 
	7,271,600,000 bd. ft. (17,150,000 m ³)†
Brazil	
	5,360,600,000 bd. ft. (12,643,000 m ³)
Sweden	
	4,727,600,000 bd. ft. (11,150,000 m ³)
West Germany	
	4,228,600,000 bd. ft. (9,973,000 m ³)
France	
	3,959,300,000 bd. ft. (9,338,000 m ³)
Poland	
	3,385,600,000 bd. ft. (7,985,000 m ³)

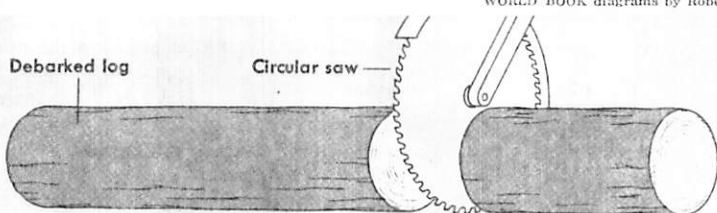
*Figures are for 1976.

†Including Taiwan.

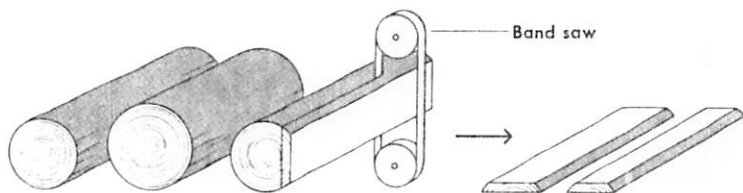
Sources: U.S. Bureau of the Census; Statistics Canada; FAO.

How a Sawmill Saws Large Logs into Lumber

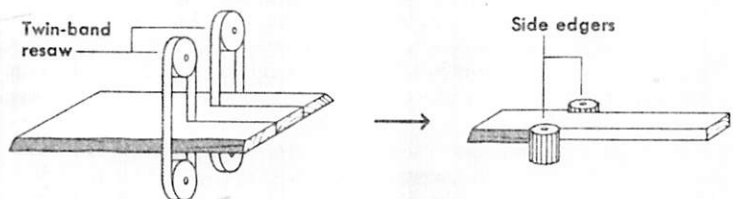
A **Circular Saw** cuts large logs into shorter lengths in a process called **bucking**. Before the logs reach the saw, a mechanical debarker strips them of their bark.



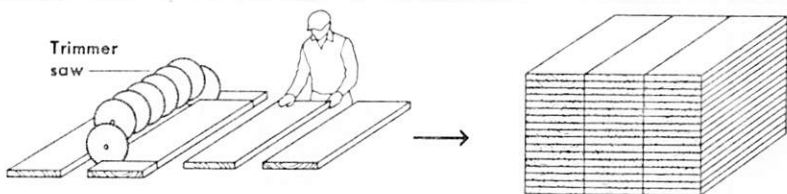
A **Headsaw** slices each log into boards or other pieces of lumber. The headsaw shown in the diagram is a **band saw**, an endless steel belt that runs on two pulleys. The teeth of the saw are on an edge of the belt.



A **Resaw** cuts lumber to its proper width and thickness. The lumber then goes through **side edgers**. These devices remove the rough edges and make the sides straight and even.

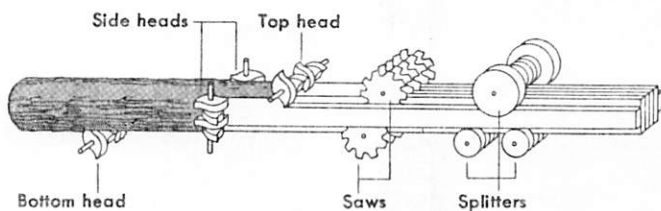


A **Trimmer Saw** cuts lumber to standard lengths and makes the ends square. Next, workers called **graders** sort the lumber according to size, quality, and kind of wood. The lumber is then stacked outdoors to dry.



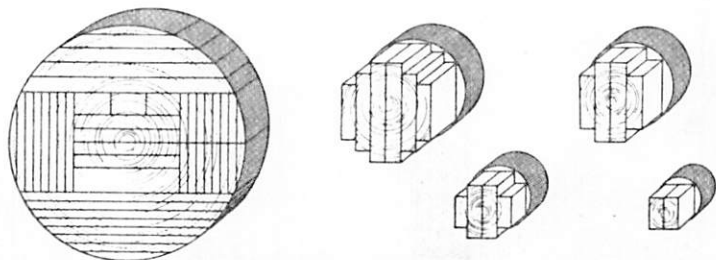
How a Sawmill Saws Small Logs into Lumber

A **Chipper-Canter**, right, saws small logs. This machine has rotating heads (knives) that chip wood from the top, bottom, and sides of logs. A set of circular saws cuts each log into rectangular pieces called **cants**. Devices called **splitters** then separate the cants.



Patterns for Sawing Large and Small Logs

Log-Sawing Patterns vary, depending on the size of the log. Mills manufacture as much lumber as possible from each log. The diagram shows several patterns that may be used to saw large and small logs.



wormy, (7) No. 3A common, and (8) No. 3B common.

The grades of hardwood factory lumber and rough hardwood dimension parts are based on the proportion of the wood that can be used to manufacture various products. If a large proportion can be used, the lumber receives a high grade. Hardwood finished market products, such as flooring and stair treads, are graded for their particular use. A high-grade piece of such lumber goes through little or no manufacturing.

Softwood-lumber associations use various grades for their lumber. Yard-lumber grades include *selects*, or *finish*, in grades A (highest quality) through D; *common boards*, numbered 1 through 5; and *common dimensions*, numbered 1 through 4. The lower numbers designate lumber of higher quality. Softwood factory lumber and shop lumber are graded for appearance. Softwood structural lumber is graded according to the load it can carry when used as beams, frames, joists, or planks.

Seasoning Lumber means removing excess moisture from the wood. More than half the weight of green lumber may come from moisture in the wood. After seasoning, less than a tenth of the weight of the lumber may come from moisture. Mills also ship lumber without seasoning. But for most uses the moisture must be removed so the wood will not warp. In the process, the wood shrinks in size.

Mills sometimes season lumber by *air drying*. Workers stack the wood outdoors to let the sun and wind dry it. A quicker way of seasoning lumber is to put green lumber in *dry kilns*, or special heated buildings in which instruments control the temperature and moisture of the air. The instruments tell how much moisture remains in the wood. Some mills use both drying methods.

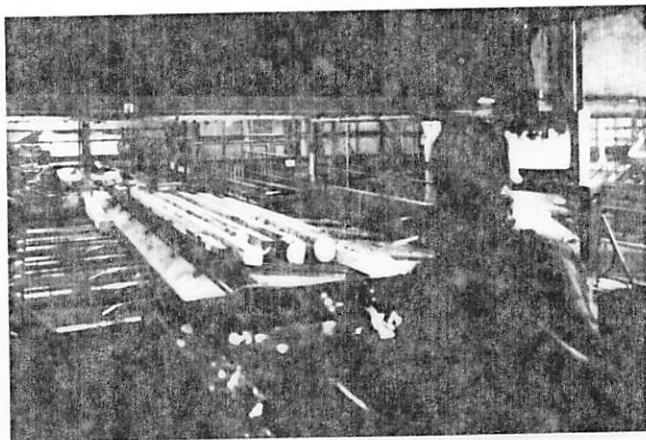
Planing. A small amount of rough lumber is used in construction. It is shipped to lumber dealers throughout the United States or in other countries. But the rest of the lumber must pass through a *planing mill* before it goes to market. This mill may be near the sawmill or in another city. In a planing mill, lumber passes through machines that have sharp knife blades in them. These knives shave and smooth the rough boards. Lumber also receives further treatment to make it into dressed lumber or worked lumber.

Shipping. Most mills ship lumber to wholesale dealers in the United States. The wholesalers sell to retail lumberyards, to factories that make wooden articles, and to construction companies. From forest to mill to retailer, lumber may travel by truck, by rail, or by ship. Most long-distance hauling is by rail. But ships bring large amounts of lumber from the West through the Panama Canal to markets on the East Coast. Trucks make most of the short lumber-carrying trips in all parts of the country.

Buying Lumber

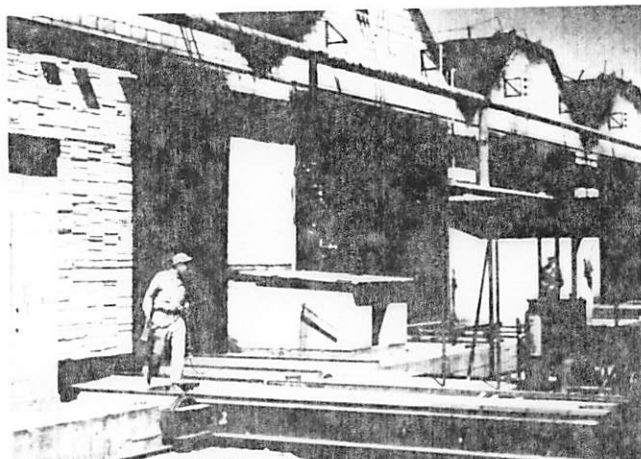
When selecting lumber, buyers should keep in mind the work they want it to do and the effect they wish to achieve. Lumber for decorative use should be chosen for its color, grain, knots, and texture. For construction purposes, strong and durable lumber should be used. Different kinds of wood are used for various types of construction. For example, Douglas fir and pine are used for home building. Oak and maple are popular for flooring, and redwood and red cedar make fine siding.

In the United States and Canada, the width and



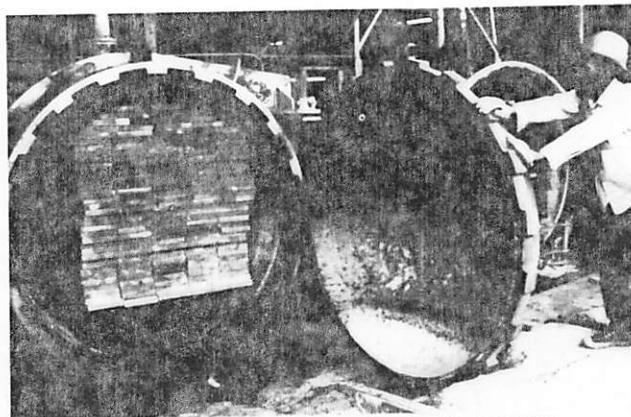
Western Wood Products Association

A Mechanical Conveyor moves logs to a saw for cutting. The worker operates the conveyor from a booth above the mill floor. Television monitors provide different views of the operation.



Western Wood Products Association

Special Heated Buildings called *dry kilns* remove excess moisture from lumber. Mills dry lumber to make it stronger and less likely to warp, thus increasing the value of the wood.



American Forest Institute

A Sealed "Treating" Cylinder applies chemicals to lumber before it is shipped from the sawmill to wholesale dealers. The chemicals protect the lumber from fungi, insects, and moisture.